

REMARKS

I. Claim Status

Prior to this amendment, claims 42-82 were pending. Without prejudice or disclaimer, claim 42 has been amended to clarify that the mixing and reacting step requires the further addition of water. The water that is added during this step is different than any water that may be associated with, for example, the at least one hydrogen peroxide precursor. Without prejudice of disclaimer, claim 42 is further amended to incorporate the limitations of claim 58, which is cancelled as a result. Claims 59-61 are amended to correct their dependencies. New claim 83 was added to recite that the addition of water may be stepwise. No new matter has been added since the specification and claims as-filed provide written description support for the claim amendments, e.g., specification as-filed at page 13, line 30 – page 14, line 10, and page 15, lines 24-32. Accordingly, claims 42-57 and 59-83 remain under consideration for their merits.

II. Rejections under 35 U.S.C. § 102(e)¹

The Examiner rejects claims 42, 45, 47, 48, 54-56, 62-65, 69, 70, 81, and 82 under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent Application Publication No. 2003/0139537 to Scholz et al. ("Scholz"). See Nov. 7, 2008, Office Action at 2-4. According to the Examiner, "Scholz teaches reacting a polyalkenylene in

¹ Applicants note that the U.S. effective filing date of the current application is December 24, 2003. Since Scholz was published July 24, 2003, it cannot be prior art under 35 U.S.C. § 102(e). Rather Scholz qualifies as 35 U.S.C. § 102(a) prior art. Thus, the current rejection is improper and CANNOT be a basis for declaring the next office action, if any, final. Nevertheless, Applicants respond to the substance of the Examiner's rejection.

an aqueous solution of hydrogen peroxide and a carboxylic acid (abstract). Scholz teaches that these are added into a flask with a stirrer, and after the reaction, the product was removed from the flask (paragraphs 0027-0029). Aqueous hydrogen peroxide is capable of forming hydrogen peroxide and therefore acts as a hydrogen peroxide precursor." *Id.* at 2.

While Applicants respectfully disagree with this rejection, solely in order to advance prosecution, Applicants have amended claim 42 to incorporate the limitations of claims 58. As recognized by the Examiner, Scholz fails to anticipate the limitations of claims 58, and, therefore, the rejection is rendered moot by the amendment to claim 42. Thus, Applicants respectfully request that the rejection be withdrawn.

III. Rejections Under 35 U.S.C. § 103(a)

A. Scholz

The Examiner rejects claims 51 and 52 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Scholz. *See* Nov. 7, 2008, Office Action at 4-5. The Examiner argues that Scholz teaches an epoxidized polymer having an epoxide oxygen content between 1 and 25%, which overlaps the claimed range, and, therefore, establishes a *prima facie* case of obviousness. *Id.* at 4.

As discussed above, solely in order to advance prosecution, Applicants have amended claim 42 to incorporate the limitations of claim 58. As acknowledged by the Examiner, Scholz fails to teach or suggest the limitations of claim 58. Therefore, because claims 51 and 52 depend directly and indirectly from claim 42, this rejection is rendered moot by the amendment to claim 42. Thus, Applicants respectfully request that the rejection be withdrawn.

B. Scholz in view of Ohtsuka

The Examiner rejects claims 43, 44, 57, and 71-80 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Scholz, as applied to claim 42 above, further in view of U.S. Patent No. 5,840,809 to Ohtsuka et al. ("Ohtsuka"). *See* Nov. 7, 2008, Office Action at 5-6.

As discussed above, solely in order to advance prosecution, Applicants have amended claim 42 to incorporate the limitations of claim 58. As acknowledged by the Examiner, Scholz fails to teach or suggest the limitations of claim 58. Therefore, because claims 43, 44, 57, and 71-80 depend directly and indirectly from claim 42, this rejection is rendered moot by the amendment to claim 42. Thus, Applicants respectfully request that the rejection be withdrawn.

C. Scholz in view of Zhang

The Examiner rejects claims 46, 49, 50, and 66-68 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Scholz, as applied to claim 42 above, further in view of Zhang et al., "Preparation of Epoxidized Rubber-Using a Reactive Processing Technique. I. Synthesis and Characterization of Epoxidized Polybutadiene Rubber," *J. Applied Polymer Science* 81:2987-2992 (2001) ("Zhang"). *See* Nov. 7, 2008, Office Action at 6-7.

As discussed above, solely in order to advance prosecution, Applicants have amended claim 42 to incorporate the limitations of claim 58. As acknowledged by the Examiner, Scholz fails to teach or suggest the limitations of claim 58. Therefore, because claims 46, 49, 50, and 66-68 depend directly and indirectly from claim 42, this

rejection is rendered moot by the amendment to claim 42. Thus, Applicants respectfully request that the rejection be withdrawn.

D. Scholz in view of Corey

The Examiner rejects claims 58 and 59 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Scholz, as applied to claim 42 above, further in view of Corey et al., "Buffered Potassium Peroxymonosulfate-Acetone Epoxidation of α,β -Unsaturated Acids," J. Org. Chem. 51:1925-1926 (1986) ("Corey"). See Nov. 7, 2008, Office Action at 7-8.

Applicants respectfully traverse this rejection for the following reasons.

Applicants respectfully traverse this rejection because the Examiner has failed to establish, as required by M.P.E.P. § 2143, a *prima facie* showing of obviousness. With respect to obviousness, several basic factual inquiries must be made in order to determine the obviousness or non-obviousness of claims under 35 U.S.C. § 103. These factual inquiries, set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 U.S.P.Q. 459, 467 (1966), require the Examiner to:

- (1) Determine the scope and content of the prior art;
- (2) Ascertain the differences between the prior art and the claims in issue;
- (3) Resolve the level of ordinary skill in the pertinent art; and
- (4) Evaluate evidence of secondary considerations.

The obviousness or nonobviousness of the claimed invention is then evaluated in view of the results of these inquiries. *Graham*, 383 U.S. at 17-18, 148 U.S.P.Q. at 467; see

also *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1730, 82 U.S.P.Q.2d 1385, 1388 (2007).

Indeed, to establish a *prima facie* case of obviousness, the Examiner must:

make a determination whether the claimed invention “as a whole” would have been obvious at that time to that person. Knowledge of applicant’s disclosure must be put aside in reaching this determination, yet kept in mind in order to determine the “differences,” conduct the search and evaluate the “subject matter as a whole” of the invention.

M.P.E.P. § 2142. “The key to supporting any rejection under 35 U.S.C. § 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious.” *Id.* The prior art references relied upon in a rejection “must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention.” M.P.E.P. § 2141.03(VI); *see also Graham*, 383 U.S. at 17, 148 U.S.P.Q. at 467.

The Examiner has not established a *prima facie* case of obviousness because the claimed invention as a whole would not have been obvious over Scholz and Corey when considered as a whole. Specifically, Scholz and Corey would have taught one of skill in the art away from preparing the disclosed epoxidized polyalkenylene in the presence of additional water.

Claims 58 and 59 of the claimed invention depend, either directly or indirectly, from claim 42 as-amended, and, therefore, also require the further addition of water.

In contrast, Scholz discloses and claims an epoxidized polyalkenylene prepared by reacting a polyalkenylene, an aqueous solution of hydrogen peroxide, and a carboxylic acid in the presence of a catalyst, “without addition of an organic solvent or water.” See Scholz at Abstract and claim 1 (emphasis added). Indeed, Scholz notes that “[k]nown processes suffer from the use of organic solvents,” which “are then difficult

to remove from the polymer." *Id.* at ¶ [0004]. Therefore, an object of Scholz is "to provide a substantially solventless epoxidation process . . ." *Id.* at ¶ [0009]. According to Scholz, "[t]he process of the invention resolves the above disadvantages of existing processes because the epoxidation takes place without the use of a solvent. An advantageous feature is that, in the subsequent workup of the products, water alone can be used as extractant." *Id.* at ¶ [0017] (emphasis added); *see also id.* at examples (water is only added after the epoxidized polymer has been synthesized). Thus, Scholz teaches that the only time water is added is after the epoxidized polyalkenylene has been synthesized, and, therefore, one of skill in the art considering Scholz as a whole would have been taught away from adding further water (i.e., in addition to the water present in the aqueous solution of hydrogen peroxide) to the process to make the epoxidized polyalkenylene disclosed in Scholz.

Even assuming for the sake of argument that Corey added water during its process, one of skill in the art would not have been motivated to add water to the process disclosed in Scholz because such a modification would render the process disclosed in Scholz inoperable for its intended purposes, i.e., a reaction without the addition of an organic solvent or water. *See M.P.E.P. § 2143.01(V)* ("If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.") (citation omitted).

Further, Corey does not teach that its hydrogen peroxide precursors are substitutable for the aqueous hydrogen peroxide in Scholz's process. First, nothing in Corey suggests they are interchangeable. Second, nothing in Corey suggests that

Corey's hydrogen peroxide precursors are suitable for epoxidizing polyalkenylene, as taught by Scholz, let alone any other elastomeric polymer. Corey merely epoxidizes acids. Further, Corey merely suggests certain hydrogen peroxide precursors are suitable for very limited processes, and not processes like Scholz.

For this reason, Applicants respectfully submit that a *prima facie* case of obviousness has not been established and the rejection should be withdrawn.

E. Scholz in view of Wurziger

The Examiner rejects claims 58 and 60 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Scholz, as applied to claim 42 above, further in view of WO 01/83466 to Wurziger et al. ("Wurziger"). *See* Nov. 7, 2008, Office Action at 8.

Applicants respectfully traverse this rejection for the following reasons.

Claims 58 and 60 of the claimed invention depend, either directly or indirectly, from claim 42, and, therefore, also require the further addition of water.

As discussed above, Scholz would have taught one of skill in the art away from adding further water (i.e., in addition to the water present in the aqueous solution of hydrogen peroxide) to the process to make the disclosed epoxidized polyalkenylene, and Wurziger could not cure this deficiency even if, assuming for the sake of argument, it used water in its process. Indeed, addition of water to the process disclosed in Scholz would render it inoperable for its intended purposes, i.e., a reaction without the addition of an organic solvent or water. *See* M.P.E.P. § 2143.01(V).

Further, Wurziger, like Corey, does not teach that its hydrogen peroxide precursors are substitutable for the aqueous hydrogen peroxide in Scholz's process.

First, nothing in Wurziger suggests they are interchangeable. Second, nothing in Wurziger suggests that Wurziger's hydrogen peroxide precursors are suitable for epoxidizing polyalkenylene, as taught by Scholz, let alone any other elastomeric polymer. Wurziger merely epoxidizes olefins, not even polyolefins. Wurziger merely suggests certain hydrogen peroxide precursors are suitable for very limited processes, and not processes like Scholz.

For these reasons, Applicants respectfully submit that a *prima facie* case of obviousness has not been established and the rejection should be withdrawn.

F. Adam

The Examiner rejects claims 58 and 61 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Adam et al., "Methyltrioxorhenium(VII)-Catalyzed Epoxidation of Alkenes with the Urea/Hydrogen Peroxide Adduct," *Angew. Chem. Int. Ed. Engl.* 35:533-535 (1996) ("Adam"). See Nov. 7, 2008, Office Action at 8.²

Applicants respectfully traverse this rejection for at least the following reasons.

Claims 58 and 61 of the claimed invention depend, either directly or indirectly, from claim 42, and, therefore, also require the further addition of water.

As discussed above, Scholz would have taught one of skill in the art away from adding further water (i.e., in addition to the water present in the aqueous solution of

² While the rejection states that is based solely on Adam (see paragraph 39 of the Office Action at 8), the text of the rejection states that one of skill in the art would have modified the process in Scholz with the hydrogen peroxide precursor in Adam (see paragraph 40 of the Office Action at 8). Thus, Applicants believe that the Examiner intended to reject claims 58 and 61 over Scholz, as applied to claim 42 above, further in view of Adam. If Applicants' understanding is incorrect, they respectfully request clarification in the next communication from the Office.

hydrogen peroxide) to the process to make the disclosed epoxidized polyalkenylene, and Adam could not cure this deficiency even if, assuming for the sake of argument, it used water in its process. Indeed, addition of water to the process disclosed in Scholz would render it inoperable for its intended purposes, i.e., a reaction without the addition of an organic solvent or water. *See M.P.E.P. § 2143.01(V).*

Further, Adam, like Corey and Wurziger, does not teach that its hydrogen peroxide precursors are substitutable for the aqueous hydrogen peroxide in Scholz's process. First, nothing in Adam suggests they are interchangeable. Second, nothing in Adam suggests that Adam's hydrogen peroxide precursors are suitable for epoxidizing polyalkenylene, as taught by Scholz, let alone any other elastomeric polymer. Adam merely epoxidizes alkenes, not even polyalkenes. Adam merely suggests certain hydrogen peroxide precursors are suitable for very limited processes, and not processes like Scholz.

For these reasons, Applicants respectfully submit that a *prima facie* case of obviousness has not been established and the rejection should be withdrawn.

Conclusion

In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration of this application and the timely allowance of the pending claims.

If the Examiner believes a telephone conference could be useful in resolving any outstanding issues, the Examiner is respectfully invited to contact Applicants' undersigned counsel at (202) 408-4152.

Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

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By: _____


Aaron M. Raphael
Reg. No. 47,885